U. S. COAST AND GEODETIC SURVEY

Henry S. Crittett, Superintendent.

State: Cal.

DESCRIPTIVE REPORT.

Hydrographic Sheet No. 2407

LOCALITY:

Hydrography of part of San Diego Bay.

1898-99

CHIEF OF PARTY:

Ferdinand Westdahl, Asst.
Description Report to accompany hydrographic sheet entitled
Treasury Department
U. S. Coast and Geodetic Survey
Henry J. Quitman, Superintendent
Hydrography of part of
San Diego Bay
California

By the party in charge of Ferdinand Middelbe, Assistant C. G. S.
Captain "Fedora"

Began December 14, 1878
Ended February 23, 1879
Scale 1:0,000

This is a survey made for the purpose of ascertaining
the amount of change wrought by the jetty construction outside
the mouth of the harbor upon the Jumiga Shoal obstruction
and the channel over the bar. The inner limit was originally
intended to embrace the so called "Riddle ground", but was later
extended so as to include the water front of the city of San Diego.
The limits of soundings have been run close purposely because my
instructions called for results which should bear "no doubt as
to the curves of equal depth". They may be too close in places,
owing principally to the scheme of their crossing, which does not
lend itself to readily to contraction or expansion, but was adopted
because in the constantly curving channel one of the three
directions would be almost if not quite at right angles to its course.

The soundings are plotted to the nearest half foot in all depths
taller than sixty feet; in greater depths to the nearest foot.
That is to say that, for instance, from 7.5 to 7.7 inclusive is
called 7½ feet, and from 7.8 to 8.2 inclusive is put down as
8 ft. This was done in order to avoid other fractions, the figures of
which would have to be made so small as to be almost illegible.
The plan of reference being already established tides were
observed only while soundings. A temporary tide staff was set
up near the end of the jetty outside the entrance and observations
made upon it, in smooth weather, every 10 minutes for 25 hours
simultaneously with the permanent gauge at the Quarantine Station wharf, LaPlaya. The two curves, reduced to the
same zero, were plotted on division paper which is fastened
in Vol. I, Tides Observations at Quarantine Station. This was
used in the following manner in reducing the soundings
made outside the harbor. Each day's tide curve at LaPlaya
was plotted on division paper and then another curve repre-
senting the simultaneous tidal conditions outside the entrance,
as shown by the diagram, was drawn freehand along the first
in a broken line. The outside soundings were reduced in ac-
cordance with this latter curve. After the work had progressed
as far as abstract of Channel Point, near San Diego, tides were
observed on a gauge established at the Santa Fe wharf. Sim-
ultaneous observations were made here also for 25 hours.
with the gauges at La Playas, and then discontinued on the
latter gauges. In applying the rule given in Sec. 85, Instructions
for Hydrographic Surveys, 1874, to the latter simultaneous observa-
tions, the difference between the mean of the gauges was found to be
2.08, on the plane of reference at the Quarantine Station, while
read 1.10 on the staff there, should read 6.05 on the staff at
the Santa Fe wharf. The difference between the low water
readings of the same gauges is 2.27, however, and as the
mean of 82 lowest low water on the gauge at Santa Fe wharf
was subsequently found to be 6.0, and the reading of the old
plane and line in 1878 (found by boring from the Bench Mark)
is 6.06, I have adopted as a compromise plane of reference
here the reading 6.0, to which all the soundings above Low
Point have been reduced. This seemed reasonable, as my
instructions specifically stated that the plane of reference
should be derived from the Bench Mark at La Playas.

The curves are drawn so as to include the outermost
soundings of the given depth. In the area outside the harbor,
where there was always more or less current, and soundings
recorded 3 to the nearest foot only, curves strictly so drawn would
appear to irregularity. I have therefore drawn them as smoothly
as possible between the outermost soundings of 18 feet, for instance,
and thereby included many soundings of 18½ and even 19 feet
within the 18 ft. curve. There are two reasons for the apparent
irregularity of the curves on the plate to the eastward, and
southward of the jetty. Only believe to be that the bottom is irregular. Whereas the flat inside the harbor was exposed at the lowest spring tides, they had a corrugated appearance and were pitted with holes of more than one foot in depth. It is reasonable to suppose that the submerged flats outside the bay are similarly constituted, except near the break where the sand is worn smooth by wave action. The other reason is the misplacement of the individual soundings between the positions, owing to the irregular speed of the steam-launch which is almost impossible to control as the boiler holds only about three gallons of water and, whereas a slow, the pump does not work regularly so that the steam pressure is continually changing. This is the first hydrographic work executed in a steam-launch that I have ever plotted and the variation in distances between positions taken at equal time-intervals, and other "lers" is little or no current to account for it, convinces me that it would be expedient to employ some mechanism, such as the sounding of a bell at the end of a certain number of revolutions of the propeller, to notify the land-surveyor when to sound, rather than time-intervals, at least in the launches during Herrshoff or similar boilers. The bottom in this channel across the Northeast end of the Middle ground inside the entrance seems to be step-like, having ledges rather than a continuous ridge.
The pilots informed me that it consisted of a ridge of sand so narrow as to be difficult to find with the lead and so soft that a stranger could easily push through it by going at good speed. Several years ago the U. S. Engineers dredged a channel across it but it did not remain growing long. To ascertain its exact condition I caused a number of lines in addition to the regular scheme to be run at black marks in the direction of the shoal and so close together that it was impracticable to plot but a small number of the soundings obtained. Of these, all the shoal soundings at least have been put down and made room for by removing deep soundings already occupying the space. Even with this treatment the result shows that it is not at present a continuous ridge, but a series of lumps so disposed as to make it difficult to pick out a channel between them. Perhaps the contraction of the wharf at the U. S. Quarantine Station, although built of iron pilings, has had a tendency to turn the 266-curent more in that direction, causing a scouring across the shoal. Pilots and others familiar with the channel have informed me that it certainly has washed out inside Beacon 2, abreast the Quarantine Station, in recent years so that launches and other small craft can pass inside the beacon when wishing to avoid the strong current. I am somewhat confirmed in above opinion by reason of the fact that at the time of the survey in 1878 another wharf
existed at La Playa and the channel across the Middle ground then had similar characteristics. This suggests the simple remedy of a wing-dam at La Playa to form a channel across the shoal.

I beg to refer to the Description Report of the topographic chart covering this area for an account of the determination of the signals used in this survey, and I respectfully call attention to the fact that the new signals are not plotted by DMI & DPC but by distances only for reasons set forth in the above report. I could not wait for the corrected data to be sent from the Office and proceeded with the plotting of the positions from data at hand. The shoaling, intended on the projection when revised remains their uncorrected, nor have the jetty and the wharf at the Quarantine Station been transferred from the topographic chart as I wanted to use all the space I could for the soundings. The same is true as regards the wharves at San Diego. There were so many and such long names inscribed on the water area, which had to be scraped out before putting down soundings, that I did not dare to disturb the fibre of the paper, still further by correcting the wharf lines. For this reason also the soundings taken at one's length from the wharves are not plotted.

For other information called for in Par. 209, Instructions for Hydrographic Parties, I beg to refer to the full notes obtained in 1897-98 by a Naval Office
specially detailed to collect such data, a copy of whose report I found on board this ship (McArthur). There have been no changes of any consequence since then so far as I know.

Respectfully submitted,

Ferdinand Westphahl

Capt. C. V. Jervis

Chief of Party